SECTION IX

STANDARDS FOR UTILITY LINES CROSSING LEVEES

9-01. General. Included in this section are underground power and communication lines, overhead utility lines and electrical pump service lines, pressure flow water pipes, force mains or gravity flow sewer lines and pressure gas mains. Large acqueduct crossings of levees and channels, such as Hetch Hetchy and EBMUD, require special study and are not a part of this section.

9-02. Underground power and communication cables. Underground power and communication cables shall pass through levees over the flood plane. Cables shall be installed in excavated trenches and backfilled so that the density of the fill will not be less than the undisturbed levee section. A minimum coverage of 12 inches is required and no portion of the cable shall be exposed in the levee section. Installation of cables in the levee crown or slopes in a longitudinal direction will not be permitted.

9-03. Overhead power and communication lines. Power and communication poles, guy wires and anchors will not be permitted on the levee crown or levee slopes. Preferably such facilities will be located a minimum of 10 feet from the levee toe. All overhead wire crossings of the levee as well as the crossing of designated levee access ramps must be installed with a minimum vertical clearance of 20 feet for low voltage lines (under 750 volts) and a vertical clearance of 25 feet for higher voltages. In addition clearances must conform with regulations set forth in State and County Codes. If power service is required for any facility on the riverside of the levee and no waterside berm exists, the service will be brought from the landside power source in an underground cable installed as outlined in paragraph 9-02. Any other services placed underground at local interest request shall be placed at no cost to the Federal government. This policy was established with the State Reclamation Board by SPKED-DL letter to the State dated 21 October 1968.

9-04. Pressure lines. These lines include water distribution lines, sewage force mains and gas lines generally installed by utility companies.

a. The invert of pressure lines shall be installed above flood plane, there shall be no restriction on pipe size. Generally the composition of the pipe meeting design requirements of the Utility Company is acceptable for installation through the levee. If steel pipe is used, it shall be soil proofed except that threaded sizes may be galvanized. Flanged connections and Dresser couplings are acceptable but they shall not be buried in the levee slope or crown. The minimum gages for steel pipe will be as follows:

(1) No. 10 gage (0.1345-inch thickness) up to and including 12 inches in diameter.

(2) No. 7 gage (0.1793-inch thickness) for pipes over 12 inches in diameter to 30 inches in diameter.

(3) No. 3 gage (0.2391-inch thickness) for pipes over 30 inches in diameter.

b. In levees constucted of impervious homogeneous fill cutoff walls (except as noted below) shall be placed around the pipe at the crownlines of the levee. These cutoff walls shall be poured-in-place reinforced concrete or plate steel as shown on standard drawing 4488/6. Where conditions are adverse to the installation of cutoff walls, such as the existence of a railroad or highway in the levee crown, and if there are no embankment shoulders, or if the pipe is well above the design flood plane, the cutoff walls may be deleted.

c. Pipes shall have a minimum coverage of 24 inches, to withstand vehicular traffic on the levee crown. If necessary the levee grade shall be raised to get the required cover over the pipe; the longitudinal slope along the levee shall not be steeper than 1 on 10. The pipes shall be installed in excavated trenches of the following widths: For pipes up to and including 12 inches in diameter, one diameter plus one foot on each side of the pipe; for pipes over 12 inches in diameter, one diameter plus one diameter on each side of the pipe up to 36 inch diameter (see standard drawing 4488/6). For pipe over 36 inch diameter trench shall be 72 inches + diameter of pipe in width. The trench shall be backfilled in 4-inch layers and compacted to the same density as the undisturbed levee. Under certain conditions, such as when a railroad or highway is located on the levee crown, the jacking of the pipe through the levee above the flood plane will be permitted. If a sleeve pipe is utilized the sleeve shall have a minimum inside diameter 2 inches greater than the outside diameter of the pressure line. The entire annular space between the pipe sleeve and the utility line shall be pressure grouted with Portland cement grout. On all installations where the pipe passes through the levee above flood plane, no portion of the pipe above the point of entry and exit shall be exposed on the landside or waterside slope. The pipe installed in the levee slope shall be placed in a trench, backfilled as described above, and shall have a minimum coverage of 12 inches.

9-05. Gravity lines. In rare instances a gravity sewer or other utility will cross under a levee usually below the base of the levee. In such cases the utility line shall be encased with reinforced concrete, 6 inches thick in accordance with drawing 4488/6, the encasement shall extend from the waterside levee toe to the landside levee toe. In levees constructed of impervious homogeneous fill poured-in-place reinforced concrete cutoff walls shall be placed around the pipe at the levee crownlines or at least 20' apart. The size of the cutoff walls shall be in accordance with drawing 4488/6. Excavation for the pipe encasement shall be by open cut with side slopes of 1 on 3. The bottom width of the cut shall be equal to the outside diameter of encasement plus one foot on each side up to 36 inch diameter pipe. For pipe over 36 inch diameter, the trench

shall be 72 inches plus diameter of pipe in width. The backfill shall be placed in 4-inch layers and compacted around the pipe encasement to a depth of 4 feet above the pipe with mechanical hand tampers as indicated on standard drawing 4488/6. From this point to levee grade the backfill shall be placed and compacted with levee construction equipment. Special consideration shall be given to installations when foundation conditions are poor such as in organic materials.